



Mega Lake Maitland Pty Ltd

Lake Maitland Uranium Project

Distribution of "*Dragoncypris outbacki*" nova gen. nova sp.
(Ostracoda)

July 2010

FINAL



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Executive Summary

Mega Lake Maitland commissioned Outback Ecology to undertake the baseline studies of the LMUP area as required for approval. In May 2007 the first baseline aquatic ecology survey of Lake Maitland was carried out with a second survey completed in December 2008. At the time of sampling the lake (playa) and surrounding claypans were dry (no standing surface water) and remained dry for the continuation of the study (to present). In the absence of lake water the presence of a dormant propagules (egg and seed) bank was made use of and a filling event was mimicked in the laboratory for both sampling events.

From these studies several invertebrates were reared to adulthood and sent to various specialists for identification. A new genus of ostracod (a crustacean commonly referred to as a seed shrimp) was reared from sediment collected from three sites at Lake Maitland. It was identified by Dr Ivana Karanovic (Ostracoda taxonomist).

Following the principles of environmental protection set out in the EPBC Act, further studies were required to ensure this new taxon was not restricted to the lake and potentially placed at risk by the proposal. The objective of this study was to increase the distribution range of the new ostracod, "*Dragonocypris outbacki*" nova gen. nova sp. (I. Karanovic) (Crustacea), outside Lake Maitland. The level of risk to the species from the proposed development would therefore be lowered.

From this study the following was identified:

- "*Dragonocypris outbacki*" was identified from four lakes within the Carey Palaeodrainage system; Lake Miranda, Lake Way, Lake Carey and Lake Maitland.
- There is dispersal of aquatic invertebrates along the Carey Palaeodrainage system with all the lakes in the surrounding area supporting the same assemblages.
- This technique allows for the analysis of the lake biota throughout the project life regardless of weather conditions.

Following these findings the risk of the proposal to the new ostracod "*Dragonocypris outbacki*" from the LMUP is considered to be very low with specimens found not only outside the resource area but in three other lakes in the Carey Palaeodrainage system. In terms of cumulative impact, the location of the ostracod in the other lakes were also in reference sites, not in sites that were considered to be impact zones for the various projects.

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1. INTRODUCTION

1.1 Project background

Mega Lake Maitland Pty Ltd (Mega Lake Maitland) proposes to develop the Lake Maitland uranium deposit, located on the Barwidgee Pastoral Station (Mining Lease M35/1089) in the Eastern Goldfields region of Western Australia. The proposal falls under the jurisdiction of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Of the seven matters of national environmental significance which require Ministerial approval two have been identified for the Lake Maitland Uranium Project (LMUP); *nuclear action* and *listed threatened species and ecological communities*. The Environmental Protection Authority (EPA) has set the level of assessment as an Environmental Review and Management Programme (ERMP) and the LMUP will therefore continue through the EPBC Act assessment process as a controlled action.

Mega Lake Maitland commissioned Outback Ecology to undertake the baseline studies of the LMUP area as required for approval. In May 2007 the first baseline aquatic ecology survey of Lake Maitland was carried out with a second survey completed in December 2008. At the time of sampling the lake (playa) and surrounding claypans were dry (no standing surface water) and remained dry for the continuation of the study (to present). In the absence of lake water the presence of a dormant propagules (egg and seed) bank was made use of and a filling event was mimicked in the laboratory for both sampling events.

From these studies several invertebrates were reared to adulthood and sent to various specialists for identification. A new genus of ostracod (a crustacean commonly referred to as a seed shrimp) was reared from sediment collected from three sites at Lake Maitland. It was identified by Dr Ivana Karanovic (Ostracoda taxonomist) and provisionally named "*Dragonocypris outbacki*" nova gen. nova. sp. ("*D. outbacki*" for this report).

1.2 Objective of study

Following the principles of environmental protection set out in the EPBC Act, further studies were required to ensure this new taxon was not restricted to the lake and potentially placed at risk by the proposal. The objective of this study was to increase the distribution range of the new ostracod, "*Dragonocypris outbacki*" nova gen. nova sp. (I. Karanovic) (Crustacea), outside Lake Maitland. The level of risk to the species from the proposed development would therefore be lowered.

This report summarises the findings of the rearing trials in relation to "*D. outbacki*". The information gathered from these trials is included in the final baseline assessment of Lake Maitland and also provides habitat tolerance ranges for various other aquatic organisms.

2. METHODS

The approach employed for this study was based on the community structure of Lake Maitland biota (the dormant propagules). The resident aquatic community of Lake Maitland consisted of taxa recorded from other lakes in the region, namely Lake Way (to the north), Miranda (north-west), and Carey (south). The majority of the taxa in Lake Maitland were typical of less saline waters, unlike other lakes which usually only have a few hyposaline species amongst the many halobionts. This suggested that the biota originated from outside Lake Maitland and entered the lake passively during high flooding from surrounding pans or floodplains.

2.1 Site selection

Sediment samples from the Carey Palaeodrainage lakes were kept as part of Outback Ecology's dormant egg and seed bank collection. Samples from Lakes Way, Maitland, and Carey known to contain the ostracod resting eggs were selected and re-wet in the laboratory. Thirteen samples were chosen from various sample years (**Table 1**).

2.2 Sediment re-wetting and invertebrate rearing

To mimic lake flooding and stimulate egg hatching, 500 mL of deionised water (DI) water was added to 200 g of dry un-sieved lake sediment from the selected sites placed in clear plastic containers. The re-wetted sediments were placed under Albite[®] cloning lights and automatic timers were used to provide a 12 hour day/night cycle.

The rearing trials ran for up to eight weeks (ostracods were considered to have reached sexual maturity in this time). An additional 200 ml of deionised water added each week to compensate for evaporation. This technique follows that described in Campagna (2007) and has proved a reliable tool for assessing the biota in temporary inland waters (see Campagna (2007) for a review of the literature).

2.3 Identification

After eight weeks the ostracods were extracted for identification. The specimens were removed and preserved with 100% undenatured ethanol (allowing for DNA analysis if required) and vouchered for identification. Specialist identification of ostracods was undertaken by Dr Ivana Karanovic (University of Hamburg).

Table 1: Sediment samples selected for the distribution study. Lakes are all located within the Carey Palaeodrainage system.

Lake	Site Code	Collection Date	GPS coordinates
Miranda	C1	Apr-03	51 J 260134 6939051
	C1	Oct-01	51 J 260134 6939051
Way	NC1	Jul-07	51 J 233152 7030970
	NC2	Jul-07	51 J 232814 7031134
	LW9	Aug-07	51 J 231907 7035853
	NC5	Jul-07	51 J 236776 7029474
	NC6	Jul-07	51 J 237369 7030132
	LWS3	Jul-07	51 J 237945 7041737
	LWS5	Jul-07	51 J 237089 7042740
Carey	WBS3	Sep-08	51 J 434838 6805999
	WBE2	Sep-08	51 J 427028 6810648
	Site 21	Apr-09	51 J 422744 6786769
	WBSC1	Sep-08	51 J 435372 6806503

3. SUMMARY OF RESULTS

From this study the following was identified:

- "*Dragonocypris outbacki*" was identified from four lakes within the Carey Palaeodrainage system; Lake Miranda, Lake Way, Lake Carey and Lake Maitland.
- There is dispersal of aquatic invertebrates along the Carey Palaeodrainage system with all the lakes in the surrounding area supporting the same assemblages.
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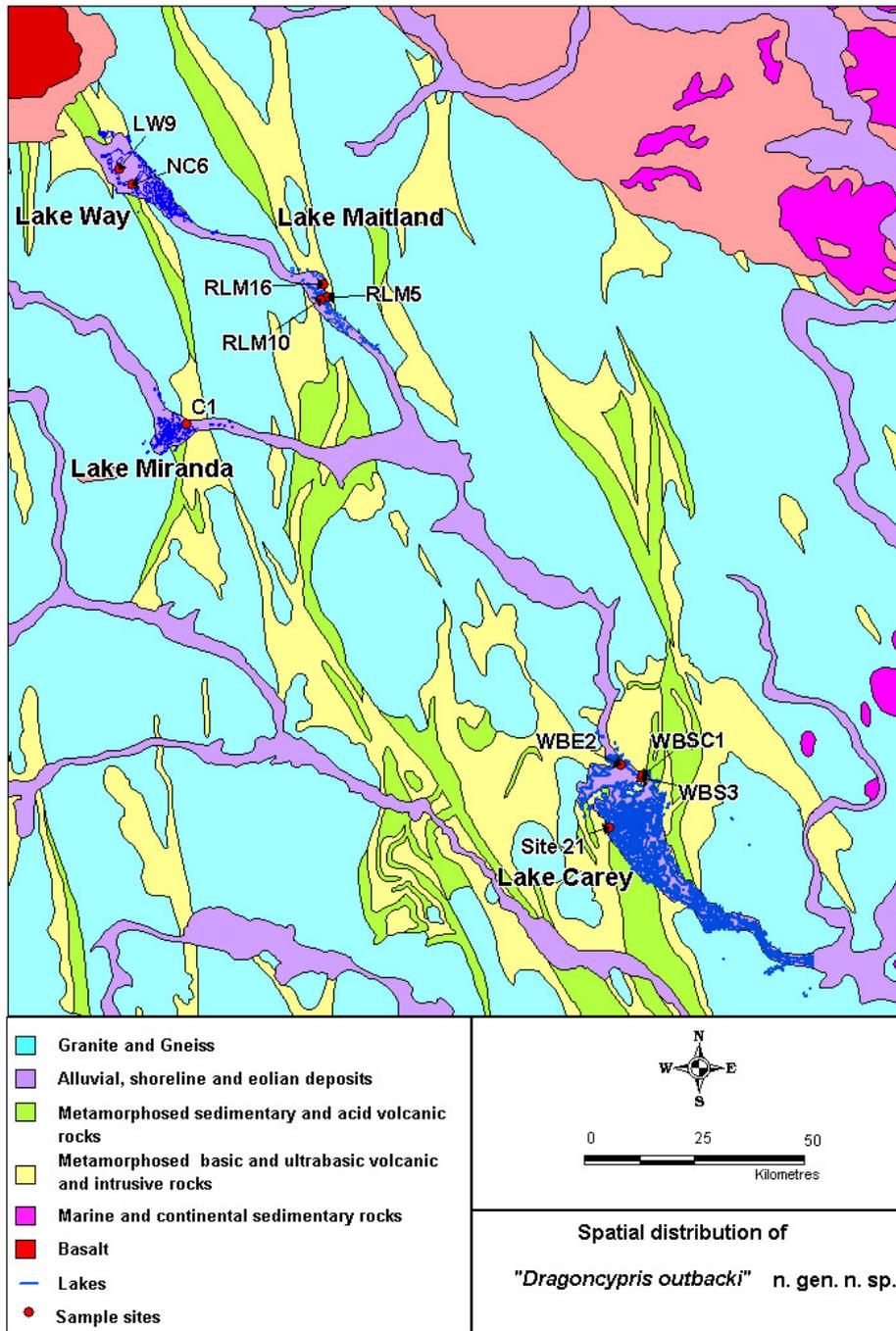


Figure 1: Distribution of "*Dragonocypris outbacki*" within the Carey Palaeodrainage system.

4. REFERENCES

Campagna, V. S. (2007). *Limnology and biota of Lake Yindarlgooda - an inland salt lake in Western Australia under stress*. Department of Environmental Biology. Perth, Western Australia, Curtin University of Technology.